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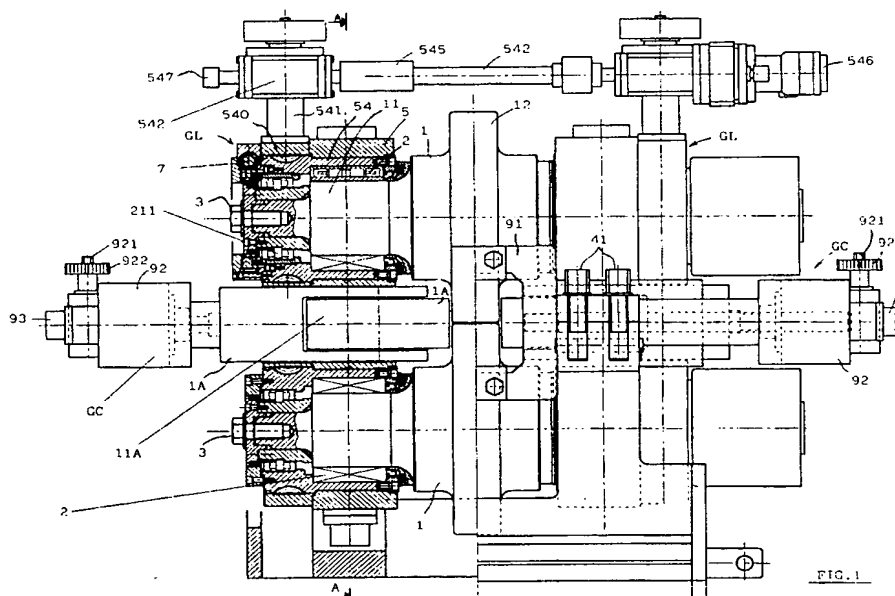
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**I-33100 Udine (IT)**(54) **Universal demountable rolling mill stand.**

(57) A universal rolling mill stand of a demountable type, involving two pairs of rolls (1,1A) respectively, one with horizontal rolls (12) and one with vertical rolls (11A), adjustable in the rolling axle base and axially, characterized in that the entire rolling mill

group (GOV) involving said pair of horizontal rolls (GO) and said pair of vertical rolls (GV) is mounted demountable from a respective support base (BA) by a horizontal ring stand support (GA) in turn demountable (41) from said base (BA).



The object of this invention is a universal demountable rolling mill stand.

Demountable and adjustable rolling mill stands which can be installed vertically or horizontally and universal (vertical and horizontal) rolling mill stands are well known.

These rolling mill stands have at times a lot of difficulty in the disassembly for maintenance intervention and to interchange the rolls.

Other aspects regard the gasket support systems of the rolls which involve a great size or oblige limits in size of the respective necks of the rolls.

The universal rolling mill stands, due to their structural complexity, have not an easy possibility of pretensioning the force of clamping between the rolls in a way that up to a certain limit they don't yield in removal (and more than this they separate) to avoid deformation of the bar in rolling.

A further problem to overcome is that when the rolls yield in removal they must freely oscillate to avoid deformations of the respective support surfaces particularly in the coupling of the respective spacers of the means of pretensioning and in order not to load in an anomalous way the bearings.

These and other aims are reached with this innovation as claimed by means of a universal rolling mill stand of a demountable type that involves two pairs of rolls, respectively, one with horizontal rolls and the other with vertical rolls adjustable in the rolling axle base and axially, characterized in that the entire rolling mill group, involving said pair of horizontal rolls and said pair of vertical rolls, is mounted demountable from a respective support base by a horizontal support stand ring in turn demountable from said base.

With this solution we obtain the advantage of:

- making easily demountable the entire machine for maintenance allowing a fast change of rolls both those horizontal and vertical, with a simple structure, robust, reliable and cheap without influencing the respective operative efficiency and able to bear a very high load capacity;
- reducing the size without influencing its use and universality. The said rolling mill group (GOV) is in turn decomposable in:
- two lateral side support structures, demountable, sliding in extraction, opposite said pair of horizontal rolls ;
- two groups of opposite vertical rolls involving each one a said vertical roll in one support for a vertical roll, mountable in said horizontal ring in an adjustable way to form a horizontal rolling mill group.

In this way we obtain a complete demountability of the rolling mill stand ensemble.

Said group is in turn decomposable in:

- two lateral side support structures, demountable sliding in extraction opposite the pair of said horizontal rolls leaving in the necks of said rolls the respective interior ring of the respective roller bearings of support of said horizontal rolls, with two pairs of pretensioning tie rods to clamp said side structures together to said rolls in said base in condition for the desired pretensioning.
- two groups of opposite vertical rolls involving each one a said vertical roll in one support for a vertical roll mounted in said horizontal ring in an adjustable way to form a horizontal rolling mill group.

In this way we obtain a complete demountability totally functional.

Said horizontal ring includes two bridges with a horizontal pair of parallel tie rods with a median spacer that realizes a ring in which center has to be inserted the rolled section.

With this solution we integrate effectively the guide system of the rolled section with the vertical rolling mill system.

The two bridges of said horizontal ring dispose in an intermediate position, tie rod strut means for the respective vertical rolls.

In this way we can carry out a very effective and precise regulation.

Said horizontal ring is demountable from said base by means of four rotatable engageable bolts on guide supports of said vertical tie rods, in turn which realize the base of the guide for the respective supports of said vertical rolls.

In this way we obtain a support system, guides and self-centering of the entire rolling mill group for the respective assembly.

Advantageously the axial alignment is made by means of regulating worm screws by only one transversal regulating axis mounted on one of the two sides.

This solution improves the technique of disassembly.

Also advantageously the rolling port (axle base variation of the rolls ) is made by means of a rotation system of eccentric compasses by only one transversal regulation axis able to be separated between the two side structures.

With this solution we simplify remarkably the total structure of the stand.

Also advantageously the structure is prearranged for the insertion of another pair of orthogonal rolls making therefore possible the obtainment of a universal stand.

These and other advantages appear in the following description and drawings which details are not to be considered imitative.

Figure 1 represents a frontal view of a partial section of the rolling mill stand.

Figure 2 represents a sectional view of the rolling mill stand according to plan A-A of Figure 1.

Figure 3 represents a sectional view of the rolling mill stand seen from above according to plan C-C of Figure 2.

Figure 4 represents a frontal view of the rolling mill group demounted from the base.

Figure 5 represents a frontal view of the base of the rolling mill stand with the respective support ring and self-centering rolling mill group.

Figure 6 represents an enlarged view of the decomposition of the rolling mill group.

Referring to the Figures, the rolling mill stand is of a demountable type with a pair of horizontal rolls (1) and a pair of vertical ones (1A) adjustable in the rolling axle base and axially, and includes:

- a support base (4-BA);
- a pair of rolls (1) with necks that mount the respective roll bearings (2);
- two side structures of lateral support rolls (GL) sliding in a counterposition from said rolls (1) leaving in the necks (11) of said rolls (1) the respective interior ring (21) of said roll support bearings (2);
- two pairs of tie rods for pretensioning (8) for clamping said side structures (GL) together to said rolls (1-GO,1A-GV) in said base in conditions of the desired pretensioning.

The axial alignment is made by means of regulating worm screws (7).

The rolling port as axle base variation of the rolls is made by means of a rotation system of eccentric compasses (54) by two vertical regulation axes (541) mounted on the respective sides (GL) connected by only one transversal axis (542,545).

The rotation is made by the seizing (543) of a toothed sector of the respective compass (540) everything incorporated in the independent support gaskets (5.6).

Also advantageously the structure is prearranged for the insertion of another pair of vertical orthogonal rolls (1A-GV) making therefore possible the obtainment of a universal stand.

These vertical rolls include the actual rolls (11A) with a support for the rolls (12A) that is mounted independently in one horizontal ring (GA) that is fixable to the base (BA) by means of rotatable bolts (41) that clamp a central portion with a vertical ring (91) for the insertion of the rolled sections. (1L).

The structure includes respective horizontal tie rods (923) on clamping blocks (81) inside which passes the vertical guide tie rods (8) that act as a slide for the supports (12A) of the vertical rolls (11A).

Two opposite bridges (92) are clamped by said horizontal tie rods (923) and these last bear tie rods (94) and strut screws (93-931) for recording

the rolling port of the vertical rolls (1A Fig.3)

The tie rods of pretensioning (8) operate on the respective gaskets (5.6) by means of median spacers (53) and extremes (51-52) that couple with the spherical surface to not prevent the eventual oscillations due to the flexion of rolls (1).

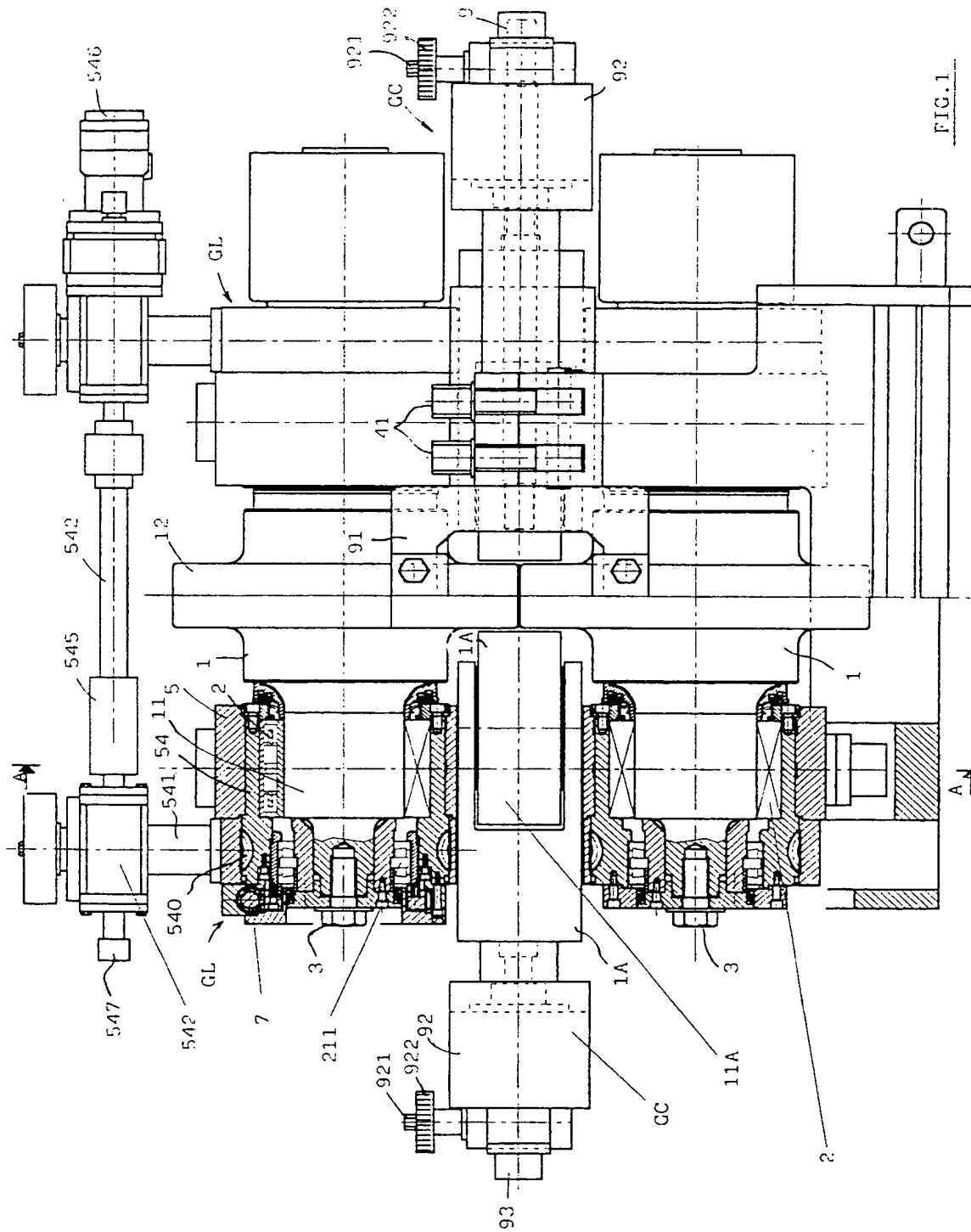
The disassemble is made as can be noted in the Figures from 4 to 6 in which the rolling mill group GOV is detached from the base BA and from the horizontal ring GA.

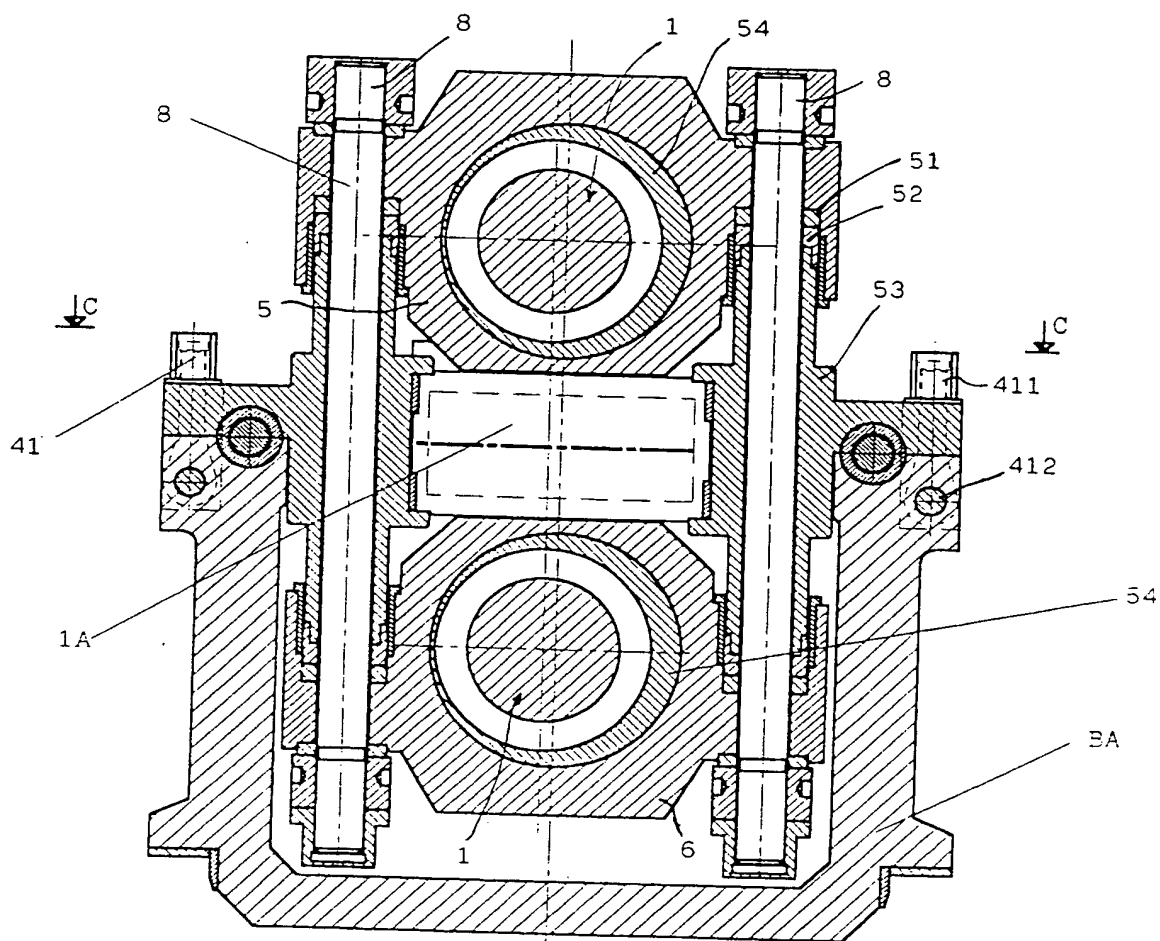
In turn the rolling mill group GOV is disassembled in two side structures GL that slide from the horizontal rolls 1 and in two groups of rolls for vertical rolling GV.

### Claims

1. A universal rolling mill stand of a demountable type, involving two pairs of rolls (1,1A) respectively, one with horizontal rolls (12) and one with vertical rolls (11A), adjustable in the rolling axle base and axially, characterized in that the entire rolling mill group (GOV) involving said pair of horizontal rolls (GO) and said pair of vertical rolls (GV) is mounted demountable from a respective support base (BA) by a horizontal ring stand support (GA) in turn demountable (41) from said base (BA).
2. A rolling mill stand according to claim 1., characterized in that said rolling mill group (GOV) is in turn decomposable in:
  - two lateral support structures (GL) demountable sliding in extraction opposite said pair of horizontal rolls (1);
  - two groups of opposite vertical rolls (GV) involving each one said vertical roll (11A) in a support for a vertical roll (12A) mountable in said horizontal ring (GO) in an adjustable way (92,93,94) to form a horizontal rolling mill group (GC).
3. A rolling mill stand according to claim 1., characterized in that said rolling mill group (GOV) is in turn decomposable in:
  - two lateral support structures (GL) demountable sliding in extraction opposite from said pair of horizontal rolls (1) leaving in the necks (11) of said rolls (1) the respective interior ring (21) of the respective support roller cylindric bearings (2) of said horizontal rolls;
  - two groups of opposite vertical rolls (GV) involving each one a said vertical roll (11A) in one support for a vertical roll (12A) mountable in said horizontal ring (GO) in an adjustable way (92,93,94) to form a horizontal rolling mill group (GC).

4. A rolling mill stand according to claim 1., characterized in that said rolling mill group (GOV) is in turn decomposable in:
- two lateral side support structures (GL) demountable and sliding in extraction opposite said pair of horizontal rolls (1) leaving in the necks (11) of said rolls (1) the respective interior ring (21) of respective support roller cylindric bearings (2) of said horizontal rolls, with two pairs of tie rods for pretensioning (8) for clamping said side structures (GL) together to said rolls (1,1') in said base in condition of desired pretensioning.
  - two groups of opposite vertical rolls (GV) each involving a said vertical roll (11A) in one support for a vertical roll (12A) mountable in said horizontal ring (GO) in an adjustable way (92,93,94) to form an horizontal rolling mill group (GC).
5. A stand according to claim 1, characterized in that said horizontal ring (GO) includes two bridges (92) with a pair of horizontal parallel tie rods (923) with a median spacer (91) that realizes a ring in which center is destined to be inserted the roller section (IL).
6. A stand according to claim 1, characterized in that said horizontal ring (GO) includes two bridges (92) that in turn are disposed in a intermediate position of the tie rod (94) struts (93) for the respective vertical rolls (1A-GV).
7. A stand according to claim 1, characterized in that said horizontal ring (GO) is demountable from said base (BA) by means of four rotatable bolt series (41) engageable on supports (81) guides of said vertical tie rods (8), in turn which realize the guide base for the respective supports (12A) of said vertical rolls (11A).
8. A stand according to claim 1, characterized in that the rolling port as axle base variation of the rolls (1,1') is made by means of a rotation system of eccentric compasses (54) by two vertical regulation axis (541) mounted on the respective sides (GL) connected by only one transversal axis (542) that can be separated.
9. A stand according to claim 1 and 2, characterized in that the rotation is made by the seizing (543) of the toothed sector of the respective compass (540) everything incorporated in the independent support gaskets (5,6).
10. A stand according to previous claims, characterized in that the tie rods for pretensioning (8) operate on the respective gaskets (5,6) by means of median spacers (53) and extreme spacers (51-52).





SEZ. A-A

FIG. 2

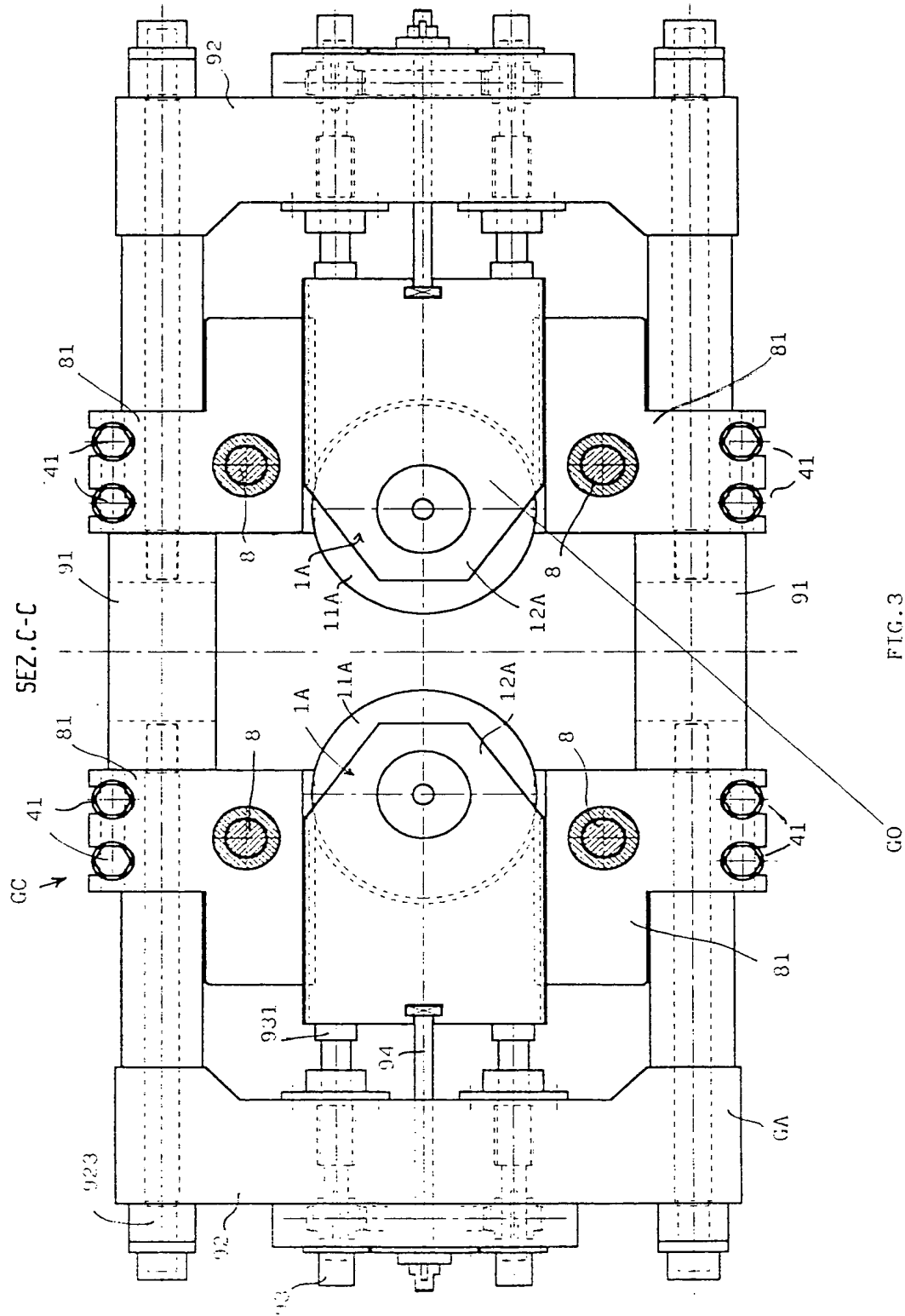


FIG. 3

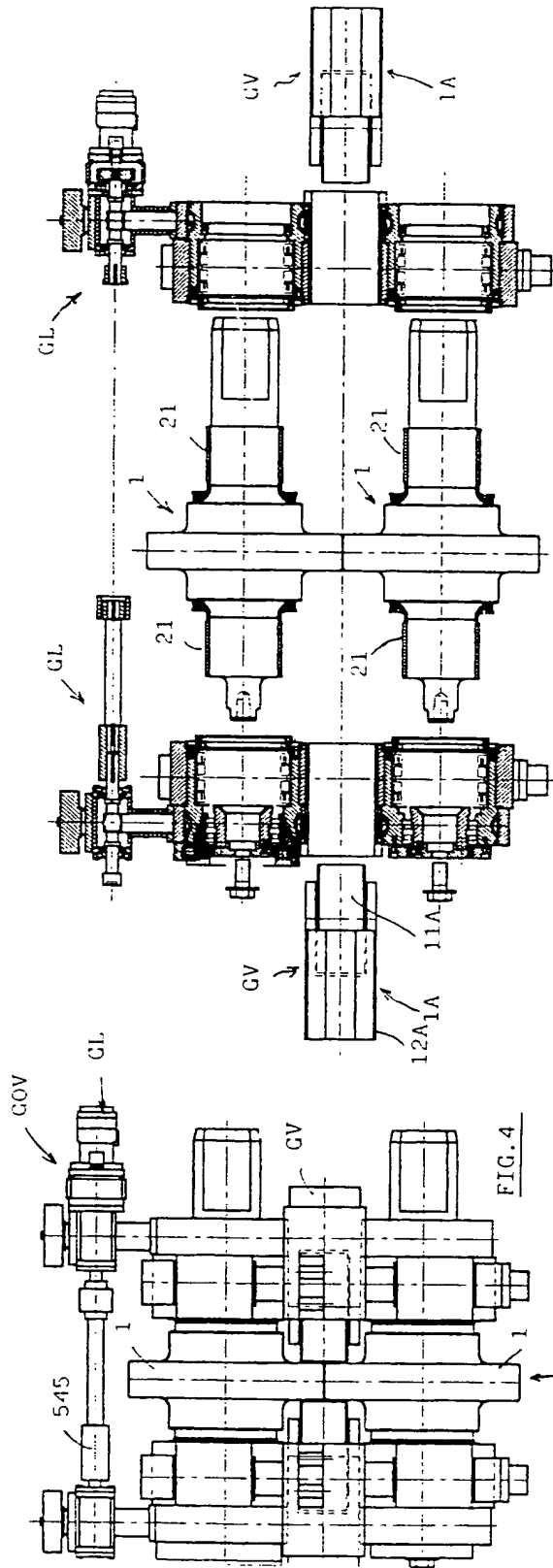


FIG. 6

GO

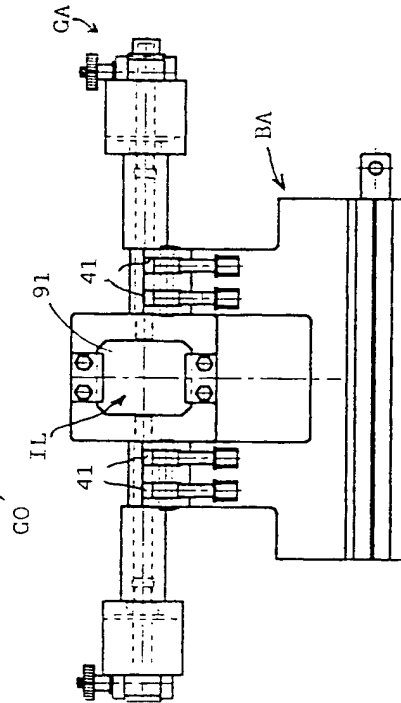


FIG. 5





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## EUROPEAN SEARCH REPORT

Application Number

EP 92 11 2398

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-C-1 072 577 (MOELLER+NEUMANN) * claims 1-5; figures 1-3 *	1-4	B21B13/10 B21B1/08
Y	EP-A-0 298 318 (SCHLOEMANN) * claims 1-4; figures 1,2,4 *	1-5	
Y	EP-A-0 291 719 (SCHLOEMANN) * claims 1-6; figures 1,2 *	1-5	
A	DE-A-2 208 403 (MOELLER+NEUMANN) * claim 1; figure 2 *	1-3	
A	DE-A-2 144 511 (SCHLOEMANN) * claims 1,4; figures 1,2 *	1	
A	DE-U-1 795 713 (MOELLER+NEUMANN) * claims 1,3; figures 1,2 *	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B21B
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 30 NOVEMBER 1992	Examiner SCHLAITZ J.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons ..... & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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